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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,285	04/08/2002	Jeffrey Scott Hepburn	201-1010 AJL	2450
22844	7590	10/21/2003	EXAMINER	
FORD GLOBAL TECHNOLOGIES, LLC. SUITE 600 - PARKLANE TOWERS EAST ONE PARKLANE BLVD. DEARBORN, MI 48126			TRAN, BINH Q	
			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 10/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/063,285

Applicant(s)

HEPBURN ET AL.

Examiner

BINH Q. TRAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-31 is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-19 and 32-38 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This office action is in response to the amendment filed August 05, 2003.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claims 1, 9-10, 13, 32-33, and 35 are rejected under 35 U.S.C. 102 (b) as being anticipated by Frost et al. (Frost) (Patent Number 4,420,316).***

Regarding claims 1, 10, 32-33, and 35, Frost discloses an exhaust aftertreatment system for a reciprocating internal combustion engine having at least one cylinder and a catalytic converter disposed in an exhaust duct of the engine which receives an exhaust gas stream from the engine, comprising a trap (e.g. 30) disposed in the exhaust duct located upstream of the catalytic converter (See col. 9, lines 50-67; col. 10, lines 1-7, and 44-52), said trap is comprised of a porous ceramic or metallic material having a predetermined average pore size, said trap substantially fills the cross-section of the exhaust duct, said trap has a porosity greater than 90 %, wherein exhaust gases undergo multiple, random turns in traveling from an upstream side to a downstream side of said trap (e.g. See Figs. 1-10; col. 10, lines 55-67; col. 11, lines 1-25; Tables 1-2).

Regarding claims 9 and 13, Frost further discloses that the trap is treated with a washcoat capable of catalyzing oxidation reactions of carbon monoxide and hydrocarbons in said exhaust gases (See col. 10, lines 11-53).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Claims 6-8, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frost in view of design choice.***

Regarding claims 6-8, and 14-19, Frost discloses all the claimed limitation as discussed above except a volume of the trap is less than 10% of a swept volume of the engine's cylinders coupled to said trap, and a pressure difference between an upstream side and a downstream side of the phosphorus trap is less than 1 kilopascal.

Regarding the specific range of the volume, and pressure difference between an upstream side and a downstream side of the trap, it is the examiner's position that a range less than 10% of a swept volume of the engine's cylinders, and the volume is less than 1 kilopascal, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as size of the engine, as well as mass flow rate of the exhaust gas, engine operating conditions, and properties of materials for making the trap and catalyst. Moreover, there is nothing

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in the record which establishes that the claimed parameters present a novel or unexpected result (See *In re Kuhle*, 562 F. 2d 553, 188 USPQ 7 (CCPA 1975)).

***Claims 2-5, 34, and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frost in view of Tsuru et al. (Tsuru) (Patent Number 5,310,548).***

Regarding claims 2-4, 34, and 36-38, Frost discloses all the claimed limitation as discussed above except that the average pore size of the trap is greater than about 80 micrometers, and the trap is capable of collecting more than 90% of particles greater than 50 micrometers in diameter.

Tsuru teaches that it is conventional in the art, to use the phosphorous trap having an average pore size of the trap is greater than about 80 micrometers, and the trap is capable of collecting more than 90% of particles greater than 50 micrometers in diameter (See col. 4, lines 15-61; col. 23, lines 40-67; Claims 17-18).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use the phosphorous trap having an average pore size of the trap is greater than about 80 micrometers, and the trap is capable of collecting more than 90% of particles greater than 50 micrometers in diameter of Frost, as taught by Tsuru for the purpose of removing odor from the exhaust gas of an internal combustion engine, so as to reduce the poisoned materials in the purifying catalyst, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claim 5, Tsuru further discloses that the porous material is foam (See col. 9, lines 1-18).

***Claims 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frost in view of Hayashi et al. (Hayashi) (Patent Number 4,934,142).***

Regarding claim 11, Frost further discloses all the claimed limitation as discussed above except that an exhaust gas component sensor disposed in said exhaust duct.

Hayashi teaches that it is conventional in the art, to use an exhaust gas component sensor (49) disposed in said exhaust duct, said exhaust gas component sensor (49) is located downstream of said trap (18) to protect said trap (See Fig. 7; col. 9, lines 35-67; col. 10, lines 1-2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to position an exhaust gas component sensor disposed in said exhaust duct of Frost, as taught by Hirota for the purpose of protecting the exhaust gas sensor, so as to control the exhaust gas components of an internal combustion engine, and further improve the performance of the engine and the efficiency of the emission device.

***Allowable Subject Matter***

Claims 20-31 are allowed.

Claims 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Since allowable subject matter has been indicated, applicant is encouraged to submit formal drawings in response to this Office action. The early submission of formal drawings will permit the Office to review the drawings for acceptability and to resolve any informalities remaining therein before the application is passed to issue. This will avoid possible delays in the issue process.

***Response to Arguments***

Applicant's arguments filed August 05, 2003 have been fully considered but they are not completely persuasive. ***Claims 1-38 are pending.***

Applicant's cooperation in correcting the informalities in the specification is appreciated. Applicant's cooperation in explaining the claims subject matter more specific to overcome the claim objections relating to indefinite claim language is also appreciated.

Applicants' s arguments with respect to claims 1-38 have been considered but are moot in view of the new ground(s) of rejection as discussed above.

***Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of five patents:

Pischer, Jr. (Patent Number 4,417,908), Sekhar et al. (Patent Number 5655212), and Stobbe (Patent Number 5,497620) all discloses an exhaust gas purification for use with an internal combustion engine.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (703) 305-0245. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (703) 308-2623. The fax phone number for this group is (703) 746-4561.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

BT  
October 19, 2003



Binh Tran  
Patent Examiner  
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